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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 10/694,882      | 10/29/2003  | Tae-Kyoung Kim       | 253/045             | 4108             |

7590 03/16/2004  
LEE & STERRA, P.C.  
Suite 2000  
1101 Wilson Boulevard  
Arlington, VA 22209

EXAMINER

STEVENSON, ANDRE C

ART UNIT PAPER NUMBER

2812

DATE MAILED: 03/16/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

|                              |                                 |                            |  |
|------------------------------|---------------------------------|----------------------------|--|
| <b>Office Action Summary</b> | Application No.<br>10/694,882   | Applicant(s)<br>KIM ET AL. |  |
|                              | Examiner<br>Andre' C. Stevenson | Art Unit<br>2812           |  |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is FINAL.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 9-14 is/are allowed.
- 6) ☒ Claim(s) 1 and 5 is/are rejected.
- 7) ☒ Claim(s) 2-4 and 6-8 is/are objected to.
- 8) ☐ Claims \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are objected to by the Examiner.
- 11) ☐ The proposed drawing correction filed on \_\_\_\_ is: a) ☐ approved b) ☐ disapproved.
- 12) ☐ The oath or declaration is objected to by the Examiner.

### Priority under 35 U.S.C. § 119

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).
- a) ☒ All b) ☐ Some \* c) ☐ None of the CERTIFIED copies of the priority documents have been:
1. ☒ received.
2. ☐ received in Application No. (Series Code / Serial Number) \_\_\_\_.
3. ☐ received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. & 119(e).

### Attachment(s)

- |  |  |
|--|--|
| 15) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                             | 18) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). ____.  |
| 16) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                    | 19) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 17) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____. | 20) <input type="checkbox"/> Other: _____                                    |

### **Detail Action**

Acknowledgment is made of applicant's claim for foreign priority under 35 U.S.C. 119(a)-(d). The certified copy has been filed in parent Application No. 10694882, filed on October 29, 2003.

### **DETAILED ACTION**

#### ***Claim Rejections - 35 USC § 102***

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims rejected under 35 U.S.C. 102(b) as being unpatentable by Nakano et al (U.S. Pat. No.6153444).

Claims **1** and **5** are rejected under 35 U.S.C. 102(b) as being unpatentable over Nakano et al (U.S. No 6153444).

Nakano et al (U.S. No 6153444), for **Claim #1**, a method of measuring a concentration of a material comprising: irradiating an infrared light onto a semiconductor substrate having a layer formed thereon (**Column 4, lines 38 through 67, Column 5, lines 2 through 5**), the layer including a first material and a plurality of dopants of which an entire intensity is less than an intensity of the first material, wherein a portion of the infrared light is absorbed in the semiconductor substrate including the layer and a remaining portion of the infrared light is transmitted through the semiconductor

substrate including the layer **(10, lines 58 through 67, Column 11, lines 1 through 15)**; computing intensities of the infrared light absorbed in the first material and the plurality of dopants in accordance with light wave numbers by utilizing a difference between an entire intensity of the infrared light and an intensity of the infrared light transmitted through the semiconductor substrate including the layer and by utilizing a difference between an entire intensity of the infrared light absorbed in the semiconductor substrate including the layer and an intensity of the infrared light absorbed in only the semiconductor substrate; observing light wave number regions respectively corresponding to predetermined intensities of the infrared light absorbed in the first material and the plurality of dopants among all the light wave number regions absorbed in the first material and the plurality of dopants; and obtaining concentrations of each of the plurality of dopants by utilizing a ratio of the light wave number regions corresponding to the predetermined intensities of the infrared light absorbed in each of the dopants with respect to the light wave number region corresponding to the predetermined intensity of the infrared light absorbed in the first material, **(Fig. 2 & 6, Column 5, lines 58 through 67, Column 6, lines 1 through 20)**

With respect to **Claim #5**, a method of measuring a concentration of a material comprising: irradiating an infrared light onto a semiconductor substrate having a layer formed thereon **(Column 4, lines 38 through 67, Column 5, lines 2 through 5)**, the layer including a first material and a plurality of dopants of which an entire intensity is less than an intensity of the first material, wherein a portion of the infrared light is

absorbed in the semiconductor substrate including the layer and a remaining portion of the infrared light is transmitted through the semiconductor substrate including the layer; computing intensities of the infrared light absorbed in the first material and the plurality of dopants in accordance with light wave numbers by utilizing a difference between an entire intensity of the infrared light and an intensity of the infrared light transmitted through the semiconductor substrate including the layer and by utilizing a difference between an entire intensity of the infrared light absorbed in the semiconductor substrate including the layer and an intensity of the infrared light absorbed in only the semiconductor substrate **(10, lines 58 through 67, Column 11, lines 1 through 15)**; observing light wave number regions respectively corresponding to predetermined intensities of the infrared light absorbed in the first material and the plurality of dopants among all the light wave number regions absorbed in the first material and the plurality of dopants; and obtaining concentrations of each of the plurality of dopants by utilizing a ratio of the intensity of the infrared light absorbed in each of the plurality of dopant corresponding to an entire light wave number regions with respect to the light wave number region corresponding to the predetermined intensity of the infrared light absorbed in the first material, is taught by Nakano et al (U.S. No 6153444) **(Fig. 2 & 6, Column 5, lines 58 through 67, Column 6, lines 1 through 20)**.

### **Objected Claims**

Claims 2 through 4 and 6 through 8 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claim #2

- ✓ Plurality of dopants include boron and phosphorus.

Claim #3

- ✓ Measuring an intensity of the infrared light absorbed in the semiconductor substrate, prior to forming the layer including the first material and the plurality of dopants on the semiconductor substrate.

Claim #6

- ✓ Plurality of dopants include boron and phosphorus.

Claim #7

- ✓ Prior to forming the layer including the first material and the plurality of dopants on the semiconductor substrate.

**Allowed Subject Matter**

The following is an examiner's statement of reasons for allowance: The prior art fails to teach obtaining concentrations of a first boron dopant and a first phosphorus dopant by utilizing a ratio of the first light wave number regions corresponding to predetermined intensities of the first infrared light absorbed in the first boron dopant and the first phosphorus dopant of the first BPSG layer with respect to the first light wave number region corresponding to a predetermined intensity of the first infrared light absorbed in a first silicon of the first BPSG layer.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Claims 9 through 14 are allowed.

#### Claim #9

- Obtaining concentrations of a first boron dopant and a first phosphorus dopant by utilizing a ratio of the first light wave number regions corresponding to predetermined intensities of the first infrared light absorbed in the first boron dopant and the first phosphorus dopant of the first BPSG layer with respect to the first light wave number region

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corresponding to a predetermined intensity of the first infrared light  
absorbed in a first silicon of the first BPSG layer

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andre' Stevenson whose telephone number is (571) 272 1683. The examiner can normally be reached on Monday through Friday from 7:30 am to 4:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Niebling, can be reached on (571) 272 1679. The fax phone number for the organization where this application or proceeding is assigned is (703) 308 7724.

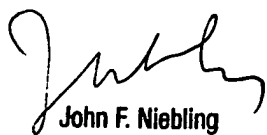
Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308 0956. Also, the proceeding numbers can be used to fax information through the Right Fax system;

**(703) 872-9306**

Andre' Stevenson

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03/03/04

  
**John F. Niebling**  
Supervisory Patent Examiner  
Technology Center 2800